OCCUPATIONAL *Hazards*

MARCH
MAR 14 1941

- Profitable Control of Dusts, Fumes and Gases
- Trend of Litigation in Workmen's Compensation
- Hammermill's Way with Workers
- Industrial Health and National Defense
- New Ideas in the Field

THE ONLY MANAGEMENT PUBLICATION DEVOTED EXCLUSIVELY TO THE ENGINEERING CONTROL OF...

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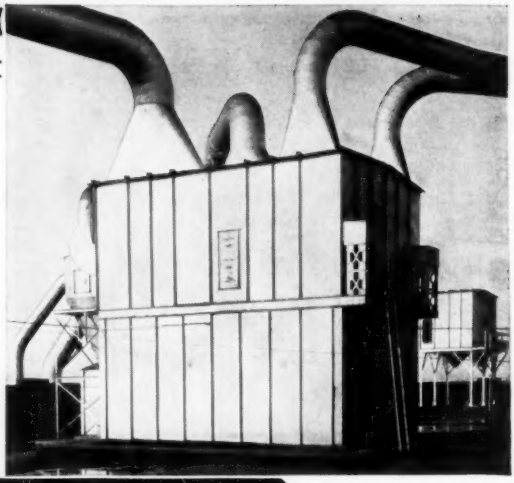

This Kirk & Blum installation includes a dust arrestor, where fine dust is extracted from the exhausted air. By returning the cleaned air into the building, much heat is reclaimed with consequent fuel savings.

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**See: "Safeguarding Manpower for Greater Production," United States Department of Labor.*

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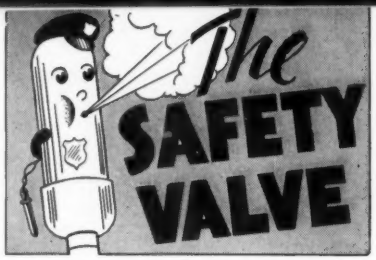

In April we publish our Annual Good Housekeeping issue. Many valuable hints and ideas will be presented for keeping an industrial "house" in good order.

The Safety Calendar

During the past few weeks a number of regional groups have announced the formulation of plans for safety and health conferences in their districts. The 17th Annual Regional Safety Engineering Conference of Western Pennsylvania will be held at Pittsburgh, April 1, 2, and 3 in the Hotel William Penn. In addition to the regular Conference program, an exhibit of health protective and accident prevention appliances is to be held.

The All-Ohio Safety Congress and Exhibit is scheduled for April 15, 16, and 17 in Columbus, Ohio, at the Neil House. Because of the growing demand for organized accident prevention work, many suggestions for new sectional meetings have been entertained.

In New York, on April 22, 23, 24 and 25 Hotel Pennsylvania will be host to the 12th Annual Safety Convention and Exposition of the Greater New York Safety Council. A very interesting program is planned.

Simplified Packing of First-Aid Unit Dressings and Treatments Recommended

A proposed simplified practice recommendation covering the packaging of first-aid unit dressings and treatments, sponsored by the First-aid Section of the Industrial Safety Equipment Association, has been submitted to all interests for consideration and approval, according to an announcement of the Division of Simplified Practice of the U. S. National Bureau of Standards.

It is the aim of this proposal to simplify the packaging of first-aid unit dressings and treatments and the maintenance of industrial first-aid kits, by establishing 3 standard carton sizes, 4 standard kit sizes, and a simplified schedule of dressings and treatments to be packed in the 3 respective cartons. Elimination of odd sizes of packages will facilitate purchasing and handling of dressings and treatments and the replenishing of kits. The use of the standard cartons will obviate the necessity for repackaging and rewrapping, and insure that the contents will remain clean and sanitary.

Permits Selection

The simplified series of cartons will permit a wide selection of combinations of dressings to be made for any selected size of kit; the latter having been determined by consideration of the number of persons to be protected and the nature and frequency of the injuries likely to be encountered.

If approved by the industry, the recommendation will be promulgated by the U. S. Department of Commerce, to become effective from a date to be announced later. Mimeographed copies may be had without charge upon application to the Division of Simplified Practice.

The literature briefly described in this department gives important information on products and equipment designed to control occupational hazards. Manufacturers' technical executives tell of the features to be found in their goods. Be sure to get all available data through this literature before buying. Note those items desired on coupon below and mail. See pages 20, 21, and 22 for New Ideas.

385—SAFETY LADDERS—ALUMINUM LADDER COMPANY—44 pages have been devoted to detailing their full line of standard safety ladder equipment. Specifications illustrations, suggested uses are all included.

386—VENTILATING EQUIPMENT—HARTZELL PROPELLER FAN COMPANY—Actual case histories of how the use of fans has boosted worker efficiency, and other interesting user comments are presented in this bulletin.

387—DUST CONTROL INSTALLATIONS—KIRK & BLUM MFG. CO.—A bulletin entitled "Dust Control Systems in Metal Industries" illustrates K & B's sound engineering approach to installations.

388—PORTABLE DRINKING FOUNTAIN—DOBBINS MFG. CO.—4 page circular indicating the many uses for portable drinking equipment. Contains also listing of accessories that can be used.

389—NEW HANDLING MECHANISM—CLEVELAND CRANE & ENGINEERING CO.—In a four-page circular many industrial applications are suggested for a cab carrier to be added to the Cleveland Tramrail. Safety features are discussed.

390—PUNCH PRESS DEVICE—POSITIVE SAFETY MFG. CO.—A Bulletin describing in detail, with photographs and diagrammatic sketches, the uses for Poesons Punch Press safety device. A list of users is included.

391—SAFETY STEEL STAMPS—M. E. CUNNINGHAM CO.—Circular containing information on the line of safety stamps manufactured by this Company. Prices and types are reviewed.

392—ALL-PURPOSE GAS MASK—ACME PROTECTION EQUIPMENT CO.—4 page bulletin describing the full vision mask for protection against carbon monoxide and all other gases. Notes on the design and construction outlined.

393—FATIGUE REDUCING CHAIRS—ROYAL METAL MFG. CO.—In a 32 page book numerous uses are suggested for fatigue reducing chairs. Liberally illustrated.

394—DUST CONTROL—C. B. SCHNEIBLE MFG. CO.—Detailed information defining this Company's approach to industry's dust problems, and how their equipment is designed to handle various dusts.

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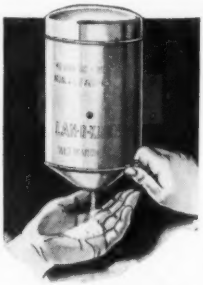

Harsh soap or management tolerance of misguided washing practices by employees seeking a short cut to grease removal can aggravate any tendency to dermatitis. Many skins not ordinarily susceptible are made so by harmful washing practices.

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Record the Accident Costs and Get Results

Two suggestions to help inaugurate a successful eye protection program, especially from the point of view of all-over effectiveness, have been advanced by T. A. Walsh of the American Optical Company's Safety Division.

First step in starting such a program, he states, is to keep adequate and accurate records of accident costs and data. These records should include costs of medical expense, compensation for lost time, loss in production, spoilage, and other pertinent information.

Second, if a report need be made to top management it should be developed in terms of dollars and cents, and not in man hours. If a report is submitted that $200 was lost in a department because of eye injuries and only $100 is needed to equip everybody in the department with safety goggles to prevent the recurrence of such expenses, the moral is obvious.

Company Saves $15,000

A case in point mentioned by Mr. Walsh was that of a company in the metal working industry who in 1929 employed 41,500 people, and their bill for eye accidents in that year was $51,000. The safety director presented these figures to the management and received their support to inaugurate an eye protection program. In 1936 the company employed 43,500 persons, and the bill for eye inquiries was only $5,800! Assuming that $30,000 was invested in eye protection equipment, the firm saved $15,000.

OCCUPATIONAL Hazards

MARCH 1941

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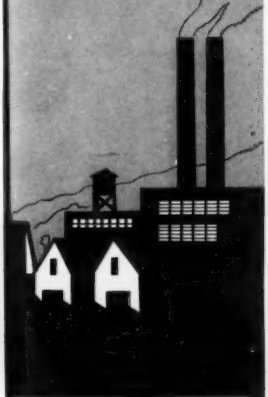
Jack Weiss, Editor



Circulation this issue more than 23,000 copies

BY SUBSCRIPTION, one year, $1.00. Single copies, Ten cents.

DUST, FUME & ELIMINATIO PROPER VNT

By PAUL A. BREHM, M.I upervisc
Unit, Mad Wiscon

IN THE consideration of dusts, fumes and gases encountered in most of our modern manufacturing processes, it is important to know the nature of these substances in each industrial plant before the proper control measures can be applied.

Types

The many different kinds of dusts, fumes and gases run into the hundreds and it is impossible to discuss them in detail here or to give a very complete classification of the various kinds encountered. For our purposes we will roughly classify these substances into:

1. Harmful—that is, those dusts, fumes, and gases which are known to be definitely harmful to the human mechanism. By harmful we mean that these materials are capable of producing disease or disability to exposed workmen. The harmful effects on the human system may be briefly classified as follows:

   (a) Local manifestations. Where disease is produced when the harmful substance comes into direct contact with local tissues or organs. This we find in the case of silicosis caused by inhaling free silica particles.

   A large group of local diseases are the various

Dust control installations require specialized engineering skill, such as portrayed in the jobs illustrated.

Photos courtesy Kirk & Blum Mfg. Co.

Top pl cyclone indicat gineere the sou

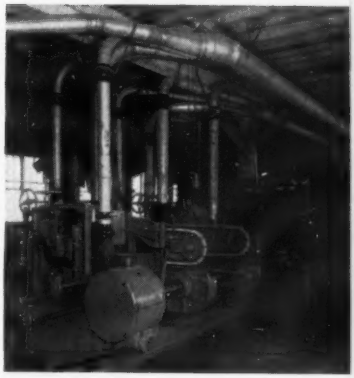
Phot

...UE and GAS ...NATION by ... VNTILATION

...M, M.D...upervisor Industrial Hygiene
...it, Mad... Wisconsin

skin manifestations resulting from harmful substances coming in direct contact with the skin and mucous membranes. Occupational dermatoses constitute over 65% of the occupational diseases.

(b) The systemic poisonings. Many substances do not necessarily produce local disease but can cause bodily harm by the chemicals which result from solution or absorption by body fluids. An example is when lead dusts or fumes are inhaled and in the process of en-



Top photograph is of large cyclone installation. Next two indicate specialized piping engineered for dust removal at the source.

Photos courtesy Kirk & Blum Mfg. Co.

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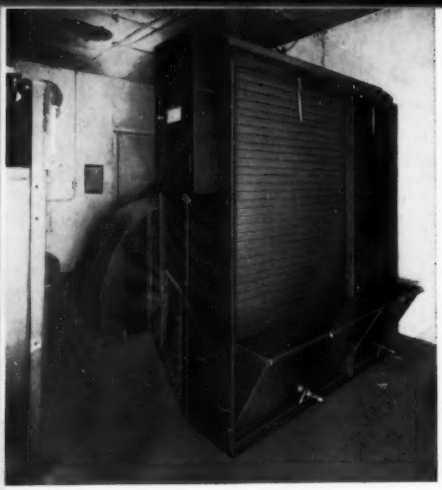

tering the blood stream are changed chemically into a substance which is capable of producing poisoning.

(c) Effects upon specific regions or organs. Some materials may be absorbed without producing generalized or systemic disease but may exert their toxic effects upon some specific organ or portion of the body. For example, bladder tumors from exposure to certain aniline dyes.

2. Harmless. Generally speaking, there is no such thing as an absolutely harmless dust, fume or gas. If these substances are inert or so-called "harmless" within themselves, it is conceivable that they might interfere with workmen by merely occurring in excessive concentrations and producing a

Dust control installation exhausting portable and stand grinders. No dust problems now.

Photos courtesy American Air Filter Co.

Each dust hazard requires its specific control application. There is no substitute for experience.

nuisance or act as irritants and predispose the workmen to common respiratory illnesses. Some substances considered harmless at the present time may prove injurious to health in the future after more is known of their properties and more experience is gained from extensive use in industry. We also know that some gases may be considered harmless as such, but in sufficient concentrations can become dangerous simply because of reduction of oxygen content in the air.

Elimination

There are several reasons for eliminating excessive concentrations of dusts, fumes, vapors and gases from workroom air regardless of whether they are harmful or harmless to the human system.

1. To prevent occupational diseases caused by harmful substances. Unless proper measures are installed for control of hazardous concentrations of dusts, fumes and gases, occupational diseases can occur.

2. To prevent loss of raw materials. In some industries the dusts

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generated from manufacturing processes result in a loss of raw materials. Recovery of this material for re-use involves a saving.

3. To prevent the nuisance factor. Concentrations of any dust, fume or gas can become a nuisance to the workers. A nuisance may be manifested by a mechanical irritation or clogging of the nose or throat, irritation of the eyes and objectionable odors. Exposures to high concentrations over a sufficiently long period of time can predispose to respiratory diseases, especially in sensitive individuals.

4. Reduction of accidents. Concentrations of dust, fumes, or gases in the workroom air sufficient to impair the visibility of the workers is a very potent factor in the cause of occupational accidents. Again, the fact that materials are removed by proper ventilation from the workroom air, particularly in the case of dust, and are not allowed to accumulate around the working area promotes better working conditions and better working environment in general.

   From the standpoint of harmful substances, we know that if workers suffer ill effects because of exposures to these materials that such impaired health renders them less alert to accident prevention.

5. To improve the efficiency of workmen by better working conditions. It has been proved in several instances that where the general working conditions are

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improved as the result of eliminating dust, fumes, and gases that the efficiency of the workers is increased. It has also been shown that this efficiency has been increased with a decrease in the extent of fatigue experienced by the workers.

6. Fire and explosion hazard. We know that many of the dusts, fumes, and gases encountered in industry are hazardous from this standpoint, and we know the consequences of improper control. We have had tragic examples of explosions in aluminum plants, grain elevators and paint and chemical manufacturing plants.

7. To reduce wear and tear on machinery and moving parts. If these materials are not properly eliminated they may accumulate on the machinery used in the manufacturing process. This accumulation may in time cause damage to machinery, unnecessary wear and tear and result in repair and replacement cost.

In certain operations of the printing industry, for instance, a fine spray is used to prevent offset. The materia s present in this spray in themselves have not been shown to be detrimental to health. However, machine manufacturers point out that the presence of this material is liable to produce greater wear and tear on the mechanical equipment.

8. To alleviate fear (justifiable or not) on the part of the workmen of injury to their health by exposures to high concentrations of dusts, fumes, and gases. Such anxiety tends to produce unrest, lack of co-operation and reduced efficiency.

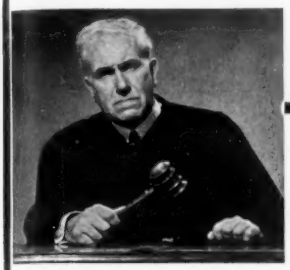
9. Indifference to general health measures. A dirty or unpleasant working environment does not stimulate workers to safeguard their health or safety at work or at home.

Ventilation

1. Natural. Natural ventilation

(Please turn to page 31)

Right off the Docket



The trend of litigation on workmen's health and accident compensation is reflected in these briefs of the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist.

Failure to Provide Fume Control Equipment Results in Judgment

This was an action brought against the company for injuries resulting from failure to provide a safe place to work for the injured employee. Under the New Jersey Workmen's Compensation Act tuberculosis is not a compensable disease unless it results from "accident," and consequently this proceeding was not brought under the Compensation Act, but by an action at law.

The employee's work required him to repair tanks containing chemicals, and pipe lines used to transmit acids. For four years he was constantly exposed to fumes and acids and chemicals, and acid dust. His only protection against the inhalation of the fumes and dust was a common red handkerchief worn over part of his face. He started to cough, have throat irritations and night sweats. X-Ray pictures disclosed that he was suffering from tuberculosis brought on by the conditions of his employment which had lighted up a dormant tubercular condition.

The Court granted a judgment to the employee. It stated that it is the duty of an employer to provide for the employees reasonably effective devices, means and methods, to prevent the contraction by them of any illness or disease incident to the work or process in which they are engaged. In this case there was a failure to ventilate properly and a failure to use effective means to protect the worker from the inhalation and ingestion of the harmful fumes and dust.

Dailey vs. Mutual Chemical Co. of America (N.J.) 16 Atl. 2nd 557 (Dec. 1940)

Award for Frozen Fingers

An artist employed in painting murals on an outside wall in an arcade adjacent to the Teller House in Central City, Colorado, froze the thumb and index finger of his brush hand. The Court granted an award holding that this was an injury resulting from an "accident" under the Compensation act, because it appeared that the arcade was open at both ends, permitting cold wind to sweep through it, so that the artist was exposed to cold and windy weather not common to the community, and that the artist had no choice but to comply with the requirement of working in the open and subjecting himself to the hazard of freezing weather or lose his job.

Gates vs. Central City Opera House Ass'n (Colorado) 108 Pac. 2nd 880. (Dec.-1940)

Death Caused by Excessive Heat and Overexertion

On a sultry day during a heat wave in the City of Providence the deceased employee was engaged in making repairs to the electrical equipment of a race track. He worked directly under the roof of the grandstand, and also in a small, windowless compartment. After working all morning

the employee suddenly collapsed, and before medical aid reached him he died. The medical testimony was that the cause of death was acute myocorditis (heart condition) probably induced by overexertion and excessive heat.

The Court found that the conditions under which the employee worked on the day of his death were not usual to the employee in the ordinary course of his employment, and consequently the death induced by the excessive heat and the overexertion was death due to an "accident" within the Compensation Act, and compensable.
Barker et al vs. Narragansett Racing Ass'n. Inc. (R.I.) 16 Atl. 2nd 495 (Nov.-1940)

Sudden Strain Brings on Failure of Previously Weakened Heart

The deceased employee, 48 yrs. old, who had a chronic heart condition, was unloading rag bales weighing from 800 to 850 lbs. each. One of the bales slipped and fell toward him. By a sudden exertion and with the assistance of two helpers the bale was prevented from falling. The employee complained of pain in his chest and in about two minutes collapsed and died.

The question here was whether the death was attributable to the normal development of the employee's heart ailment, or to the unusual exertion put forth to keep the bale from slipping. The Court held the latter to be the cause, and gave an award, stating; "Where a weakened organ collapses by reason of some strain on it, or a pre-existing chronic condition is so aggravated that death or disability ensues, but the strain or aggravation is attributable to some external, unexpected, fortuitous, and untoward occurrence aside from the usual course of events, death or disability is compensable."
Minsky vs. Keystone Wiper Supply Co. et al (Penn) 16 Atl 2nd 694 (Dec.-1940)

Saturation by Oil Results in Dermatitis Award

The employee in this case suffered burns in his work and received compensation for his injuries. At a later date while moving oil tubing he had oil blown on him and became saturated with oil from the waist down. This accident caused erruptions on the employee's skin, and resulted in disability.

The Court held this happening to be an accident and the disability arising therefrom to be the result of an accident rather than an occupational disease. Although the employee in his work might be expected to get oil on himself, it was unusual to be saturated to the degree that he was on the occasion in question. It was also held that although the prior burns sustained by the claimant might have made his skin sensitive and made him more susceptible to dermatitis this fact would not preclude recovery. An award was made.
Federal Underwriters Exchange vs. Price (Texas 145 S. W. 2nd 951 (Nov.-1940)

Affirms Holding that Electric Shock Causes Cancer and Death

The deceased employee sustained an electric shock and subsequently experienced pains in his abdomen and back. Prior to the accident he had been in good health and athletically inclined. The pains continued and the employee lost weight. Doctors were unable to diagnose the condition. Some 7 mo. after the shock an exploratory operation was performed and it revealed a cancer of the liver and gall bladder. Shortly thereafter the employee died.

The Court held that there was sufficient testimony of physicians and others to sustain the finding of the compensation board that the liver and gall bladder cancers from which the deceased died, were attributable to the electric shock which constituted an "accident arising out of and in the course of employment;" and was compensable.
City of Owensboro vs. Day et al (Kentucky) 145 S. W. 2nd 856 (Dec.-1940)

Digested and Compiled by
HILTON E. ROBERTS
Member of the Ohio and New York Bar

New Sales Manager

Mr. C. Leslie Jamison, for many years a member of Willson Company's Industrial Sales Division, has resigned his position to become Sales Manager of the Safety Clothing and Equipment Co., Cleveland, Ohio.

75th Birthday

The employees of The W. W. Sly Mfg. Co., Cleveland, Ohio, paid a splendid tribute to President S. C. Vessy recently by presenting him with a handsome scroll signed individually by some forty of his closest associates, in recognition of his 75th birthday, February 3rd.

"Congratulations and best wishes from your friends to our friend" was the spirit expressed, and in keeping with the feeling of everyone toward Mr. Vessy who, as president, for the past twenty years has so ably guided the business and brought it forward.

An attorney by training, Mr. Vessy practiced in Cleveland in his early days. He was a delegate to the Republican Convention that nominated William McKinley at St. Louis in 1896. He has been prominent in many civic enterprises and has a host of friends.

Dust and Fume
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Untimely Death

John T. Ryan, 57, President of Mine Safety Appliance Company, Pittsburgh, passed away in Miami, Florida, recently.

Mr. Ryan was a native of Huntingdon County, Pennsylvania—attended Juniata College and the Pennsylvania State College, from which he graduated in 1908 with a B.S. Degree in Mining Engineering. In 1934 he was given the degree of Honorary Engineer of Mines by the same institution.

During his entire business life he was actively identified with the mining industry. After graduation he became affiliated with the Rock Ridge Coal Company and later was Superintendent and Mining Engineer for Langdon Coal Company of Huntingdon, Pennsylvania.

From 1911 to 1914 he was in charge of the mine rescue and safety, and mine lamp testing division of the United States Bureau of Mines. In 1914 seeing the need for more adequate safety equipment, he and George H. Deike of Pittsburgh founded the Mine Safety Appliances Company, which today is the largest manufacturer of mining and industrial safety equipment in the world.

Worked with Edison

In 1915 Mr. Ryan worked with Thomas A. Edison in the inventor's laboratory at West Orange, New Jersey, on the design and development of the Edison Safety Cap Lamp, which is so universally used today in underground coal and metal mines throughout the world.

In December 1940 he was made an Honorary Member of the Edison "Old Timers' Club" comprised of men who worked with the late inventor in his early years.

Ryan was a member of the American Institute of Mining and Metallurgical Engineers, of which he was past chairman of the coal division, the Canadian Mining Institute, the Coal Mining Institute of America, the Pittsburgh Coal Mining Institute, the Western Pennsylvania Engineers Society, the Illinois Mining Institute, the West Virginia Mining Institute, the Rocky Mountain Coal Mining Institute, and a charter member of the National Mine Rescue Association.

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1107—Super-quality, heavy duty black rubber knee boot with 14-iron, black carbon rubber sole moulded in anti-skid cleated pattern. See list of features below. In stock in whole sizes 5 to 12.

1109—Same in 3/4 hip boot, reinforced at knee. Whole sizes 6 to 12.

1112—Same in full hip boat, reinforced at knee. Whole sizes 6 to 12.

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2—"Layered" construction for extra wear

3—Reinforced counter shaped to FIT at heel

4—Wide, moulded rubber heel wears longer

5—Sole vulcanized to upper; can't tear loose

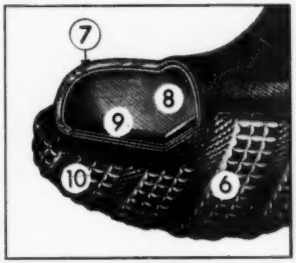
6—Extra heavy, long-wearing anti-skid sole

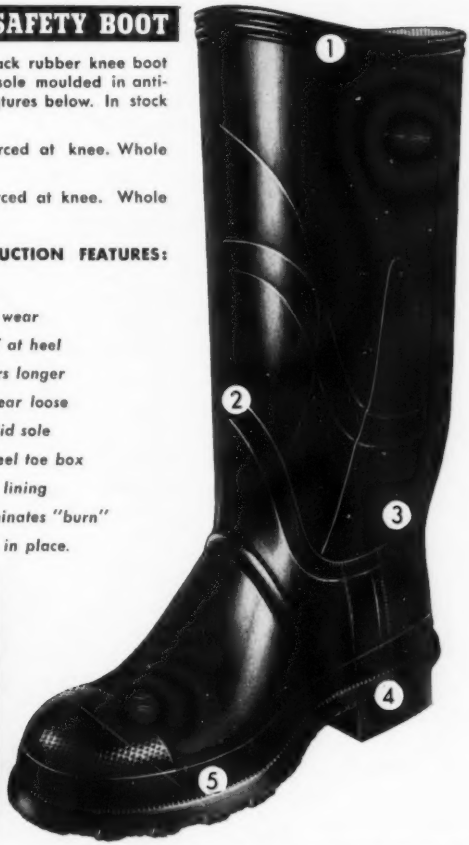
7—Heavy rubber reinforcing over steel toe box

8—Heavy, moisture-proof, boot-duck lining

9—GENUINE LEATHER INSOLE eliminates "burn"

10—Wide flange roots steel toe box in place.





This boot is a husky *. . . made especially for miners, workers in mud, water and sludge, and for wear on broken-stone surfaces that quickly would rip any ordinary boot to shreds. In addition to its exceptional wearing qualities, it provides maximum protection against crushed toes caused by rock or coal slides, or falling tools and equipment. It comes, also, in standard weight for use on any ordinary job . . . and it's only ONE of Lehigh's FIFTY specialized safety shoe styles.*

WRITE TODAY FOR COMPLETE CATALOG

LEHIGH SAFETY SHOE CO. ALLENTOWN, PA.

HAMMERMILL W
WOKE

AN Industrial Relations Department that is under Executive Management and is active in the interest of employees has been functioning at Hammermill Paper Company, Erie, Pennsylvania, for the past thirty-five years. This mill, the largest manufacturer of fine writing and printing papers in the United States, began its operations in 1898. Its motto over these many years has been "Teach, Don't Boss."

Education and training of employees begins in the Industrial Relations Department when an employee is hired. Medical examinations are given all new employees so they can be fitted to the type of employment they are physically qualified for and which will not injure their health.

☆

Training

Company policies, hours of work, wages, safety principles and working conditions are explained to them before turning them over to operating departments for instruction on the proper methods of doing their tasks. When they are assigned to operation of machines the safe method is carefully outlined to

Guards are placed over any and all operations that might result in accidents.

Employees are continually being rewarded for years of service, ideas and suggestions.

RML has a way with WOKERS

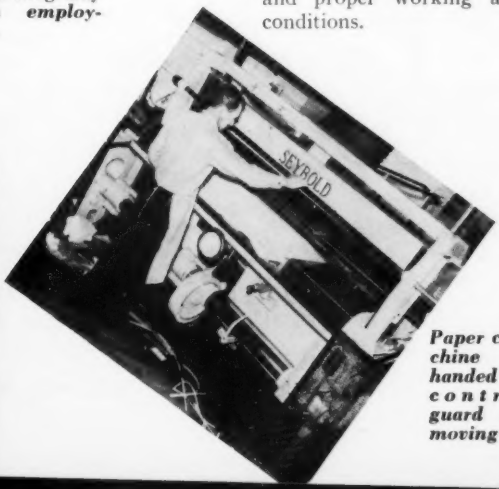
Pleasant employee relationships is a full time job at Hammermill. All activities are pointed toward healthful and safe operations.

←Clean sanitation facilities go a long way with employees.

them. At the end of thirty days a follow-up slip is completed by them and their supervisor showing that they have been assigned a clothes locker, that the operation of their job has been explained to them, and that they understood it. Their signatures are taken to become a part of their record. (See copy of Safety Follow-up Form illustrated.)

Machinery Guards

The policy of safeguarding machinery to prevent injury to employees is not limited to state or insurance company requirements, but guards are installed wherever anyone might be able to be injured. When new machinery is to be installed, or additions planned, engineering includes study by the Safety Department to see that they comply with Safety Codes for proper exits, lighting, guarding, etc. to insure the safety of employees, and proper working and health conditions.



Paper cutting machine has two handed safety control. Note guard around moving parts.

SAFETY FOLLOW-UP

Hammermill Paper Company

Department .....

No. ..... Name ..... Date of Employment .....

1. Was employee given a locker? .....
2. Has employee been fully instructed as to what his duties are? .....
3. Has employee been fully instructed how to do his job in a safe manner? .....
4. Did you emphasize the necessity of reporting to the First Aid for treatment of all injuries no matter how slight they may be? .....
5. *IF MACHINE OPERATOR*
   a. Has the operation been fully explained, and has employee been properly instructed as to the location and operation of starting and stopping devices? .....
   b. Have you explained that safeguards are placed on machine for the protection of employees, and must be kept in place? .....

Date ..... Foreman's Signature .....

I have been thoroughly instructed as to what my duties are, and how to do my job safely.

Employee's Signature .....

A suggestion system has been in effect for some time. Minimum awards of $5.00 are paid for accepted suggestions on safety or production where savings can be effected.

Other Practices

Air conditioning for the proper maintenance of the product as well as the health of employees is one of the newer phases of development.

Salt tablets, drinking water in electrical coolers, wash rooms with modern equipment, are installed throughout the plant.

Bulletin Board displays of safety messages, and articles in the employee publication describing unsafe practices are a part of the educational program. Fire drills for girls, and resuscitation practice with turbine and electrical crews, are held at regular intervals to acquaint employees with conditions should an emergency arise so they may know how to meet it.

Safety

Membership in National and Erie Safety Councils insure a supply of educational material to keep employees interested in the safety program. At regional safety conferences held yearly in Erie members of the Safety Committee are given tickets to the dinner meeting, so that they may have the benefit of

seeing and learning of the latest safety devices, and the latest developments in safe practices.

Paper mill hazards, due to the diversity of its occupations and the nature of the work, classify this industry in the high frequency group for accidents. The National Safety Council figures quote the Paper Industry as twenty-first among thirty manufacturing industries in frequency of accidents. In 1939 the frequency rate for all paper mills was 15.17 per million man hours worked. We have for many years past shown a frequency rate below this National average.

Principle

The entire safety program is based on the three principles of *engineering, education* and *enforcement,* but very little stress is placed on the enforcement principle as it is believed there is little need for it if a proper engineering and educational program is based on the slogan—Teach, don't boss.

Verne E. Minich, founder of the American Foundry Equipment Co., manufacturers of dust control equipment, and, until recently its president, becomes chairman of the board; Otto A. Pfaff, formerly vice-president and general manager, is now president of the company and remains in the capacity of general manager; Leslie L. Andrus, formerly sales manager, has been elevated to the office of vice-president in charge of sales. The appointments become effective immediately.

OVERHEAD DUST *Spells* T-R-O-U-B-L-E

END DUST HAZARDS
QUICKLY, ECONOMICALLY
with HOFFMAN EQUIPMENT

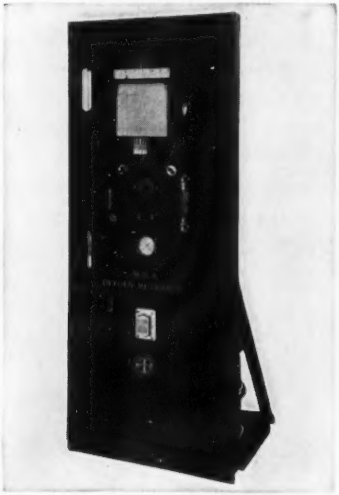
Most overhead dust was first on the floor. Pick it up from the floor, regularly and at low cost, with a Hoffman Vacuum Cleaning System—and use the same equipment for an occasional rapid, economical overhead cleaning. No dust is scattered—cleaning may be done at any time.

SEND FOR NEW ILLUSTRATED BOOKLET A303

U. S. HOFFMAN
MACHINERY CORPORATION
Air Appliance Division
98 East 12th St., New York, N. Y.

New Ja... IN THE FI...

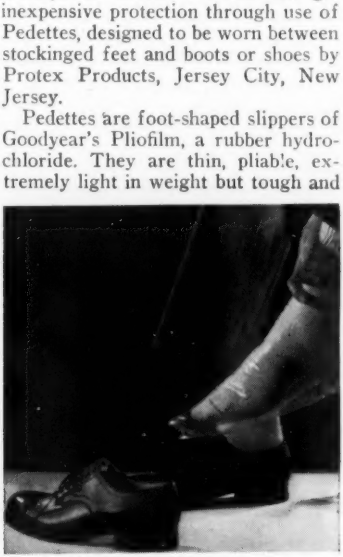
FOR MEASURING OXYGEN—The M.S.A. Oxygen Recorder is now available completely assembled on a steel panel—greatly simplifying installation, and permitting easy maintenance, announces Mine Safety Appliances Co. of Pittsburgh, Pa. The M.S.A. Oxygen Recorder is a modern



and scientifically accurate instrument for measuring and graphically recording oxygen in other gases, and is the only instrument of its type made in America. It measures oxygen concentrations from 0 to 20.8% and can be calibrated for any range desired within the above limits.

DON'T GET COLD FEET—Workers whose duties expose them to constantly wet or cold feet can now get inexpensive protection through use of Pedettes, designed to be worn between stockinged feet and boots or shoes by Protex Products, Jersey City, New Jersey.

Pedettes are foot-shaped slippers of Goodyear's Pliofilm, a rubber hydrochloride. They are thin, pliable, extremely light in weight but tough and

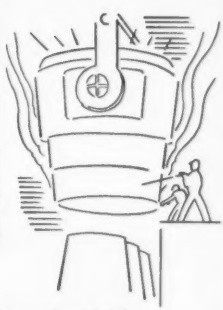


semi-plastic, conforming to the shape of the foot. It is claimed that they are waterproof, air tight, keep out penetrating cold and at the same time retain body heat.

Pedettes also are useful as locker room slippers to be worn when walking between locker and shower as protection against ringworm. A box of eight pairs is available for one dollar.

WRITE THE EDITOR FOR FURTHER DETAILS

...ew Ideas ...THFIELD



POPULAR - PRICE ELECTRIC HOIST—A full electric wire-rope hoist to be sold at popular prices is announced by the Harnischfeger Corporation of Milwaukee, manufacturers of P & H overhead handling equipment.

Known as the P & H Zip-Lift, the new hoist has been designed for flexible handling service in all lines of industry. Light enough for a man to carry, it can be mounted rigid, or on hook or trolley with mountings interchangeable when desired. It operates with pushbuttons, and is powered from an ordinary light circuit.

Features of the P & H Zip-Lift include double brakes for safety of loads, automatic limit switch to prevent loads from rising too high and jamming hoist drum, and fully enclosed construction making the unit impervious to dust, fumes, acid, or weather conditions.

FIRE PROTECTION HANDBOOK PUBLISHED—The New Ninth Edition of the Crosby-Fiske-Forster Handbook of Fire Protection for safety and fire protection engineers has just been published by the National Fire Protection Association. The New Edition of the Handbook contains 1308 pages, is complete and thoroughly up-to-date, and is commonly regarded as the standard, authoritative work in its field.

X-RAYS MAP HUMAN EYE—Splinters of glass and metal embedded in the eye can now be located with X-ray "maps" made while the patient wears a special curved contact lens over the injured eyeball. The contact lens has four lead dots on its surface.

X-rays passing through the eyeball and the lens reveal these dots as white spots on the negative. The foreign body is then charted by comparing its position on the film with the tiny white spots.

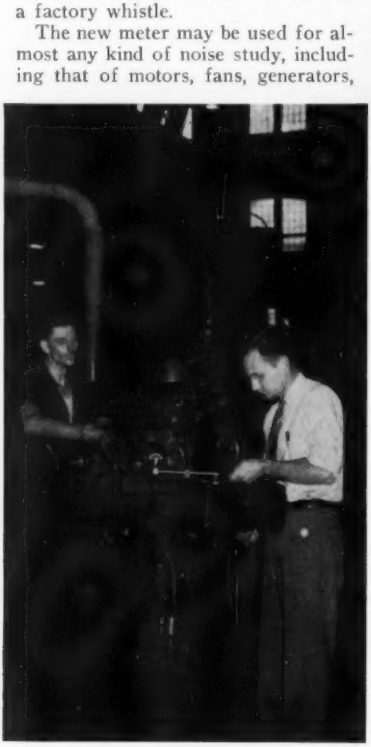
Two X-ray pictures are taken, the first showing a frontal view of the injured eye, and the second with the patient's face in profile. The side view reveals the depth to which the splinter has penetrated. The X-ray equipment is being produced by the Westinghouse X-Ray Company.

WRITE THE EDITOR FOR FURTHER DETAILS

NOISES CAN BE TRACKED DOWN—A new portable sound-level meter has been built by members of the General Electric general engineer-

ing laboratory at Schenectady, N.Y. It weighs 19 pounds and has a range of 24 to 120 decibels or roughly from the rustle of leaves to the scream of a factory whistle.

The new meter may be used for almost any kind of noise study, including that of motors, fans, generators,



turbines pumps, bearings, gears, cylinders and other parts of machinery. It is designed to perform in accordance with the recently adopted American Standards Association standards for sound level meters.

A vibration velocity unit may be substituted for the microphone on the instrument, thus providing a means of measuring vibration as well as noise.

FIVE-WAY RESPIRATORY PROTECTION—The accompanying illustration shows filters being made for a respirator developed by the American Optical Company to protect national defense and other workers exposed to

respiratory hazards. First, of its kind, the respirator has 5 interchangeable filters for use against toxic dusts, type A dusts, and low concentrations of certain fumes, vapors and gases.

NEW DRINKING CUPS—Herz Cup Company, New York, announces its new Hygeia wedge shape nested drinking cups. This development is the result of industry's growing demand for sanitary drinking cup facilities.

The Herz Company claims that the new Hygeia cups are whiter, sturdier, smoother, better balanced and have a smoother safety drinking edge which precludes all danger of cutting the lips.

WRITE THE EDITOR FOR FURTHER DETAILS

NEW FLUORESCENT LUMINAIRES—A new fluorescent luminaire

employing two 100 watt, 60-inch, white, or daylight fluorescent lamps,

and designed especially for general and supplementary high-level illumination in industrial areas is announced by the Westinghouse Electric & Manufacturing Company. Fixture consists of a hood, reflector, lamp holders, starting device, and ballast equipment.

WRITE THE EDITOR FOR FURTHER DETAILS

Gas Masks for Defense

Hundreds of female workers are now employed at factories of the Goodyear Tire & Rubber Company producing a large order of gas masks for the armed forces of the United States. Photograph shows gas masks under process of production and assembled in preparation

for shipment in the special department, which has been installed by Goodyear for the manufacture of these important defense items for the U. S. Army.

Coppus Engineer Appointed

Mr. Edwin L. Dennis, Chief Combustion Engineer, of Coppus Engineering Corporation, Worcester, Mass., since 1939, has been appointed to the faculty of the Louisiana State Univ., Baton Rouge, La.

Establishing headquarters in Baton Rouge, Mr. Dennis will assume his dual duties beginning February 1, retaining his connections with Coppus Engineering Corp.

New way to solve

ATHLETE'S FOOT

problem

If you have shower rooms, your problem is ever present. Your employees are exposed to infection every day. Our problem is to convince you that ONOX is not "just another one of those Athlete's Foot remedies."

Recent research has upset former theories regarding the control of Athlete's Foot. ONOX is revolutionary. A safe non-poisonous skin toughener does the work. You may test it under any conditions you choose to impose and without obligation. For example:

- ***We will ship prepaid, your trial order for any amount of ONOX and equipment. Use it for 60 days. If at the end of that time ONOX has not proved itself to your complete satisfaction (100%) you owe us nothing and return nothing. This offer is open at any time to established industrials.***

We would like to send you the simple details of the ONOX method now used by hundreds of institutions from Coast to Coast.

ONOX CO., Inc., Dept. B
121 Second Street San Francisco

Add Wisconsin

"In our January issue we inadvertently failed to include the State of Wisconsin among those who have statutes providing for occupational disease compensation. Wisconsin does provide such coverage and, as a matter of fact, has done so since 1919."

Hard to Believe.
The big spurt in production after installing Royal chairs is amazing.
ROYAL
FACTORY SEATING
These "seats of production" work wonders in their effect on employees, because they put more zest in their work by decreasing fatigue. Adjustable Royal chairs have resilient form-fitting backs and roomy, saddle-shaped seats. A style to fit all work and workers. Send for new catalog today.
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SELECT ROYALCHROME FURNITURE for your reception room, recreation room, rest room, lounge or cafeteria. Write for catalog.

Cement Company Scores Record

The 125 employees of the Sugar Creek, Missouri plant of the Missouri Portland Cement Company were awarded Portland Cement Associations gold buttons in recognition of their continuous record of accident-free operations.

On that date, the Sugar Creek plant had operated 2,785 consecutive days without personal injury. It is the longest record of accident-free operation currently enjoyed in an American cement manufacturing plant.

O. F. Schulzke, who recently was named General Superintendent in Charge of Production for Missouri Portland's St. Louis and Kansas City, Missouri plants, administered the company's record-breaking safety effort as Superintendent of the Sugar Creek plant. He is President of the Portland Cement Association's "$1,000-Day Safety Club," an honor maintainable only by continuance of accident-free operation.

Traumatic Hernia

A medical authority suggests the following criteria for determining a true traumatic hernia:

1. Immediate descent of the hernia following the alleged cause, be it injury or strain.

2. Severe pain in the hernia region.

3. Marked prostration.

4. Symptoms of such severity that the individual calls attention to his condition within the first 24 hours.

5. No previously existing hernia at the present site.

6. Trauma and strain must be adequate.

Where two or more of these criteria are lacking, the case is not traumatic origin.

About ten per cent of industrial workers are estimated to have a hernia.

By W. T. CAMERON, Chief Safety Adviser, Division of Labor Standards, U. S. Department of Labor

Accidents Defined

THIS month I would like to exercise a prerogative for which I believe there is considerable precedence and introduce to you a guest columnist. Mr. E. J. Bunker, Safety Inspector of the District of Columbia Government, has done some fine work in preventing accidents among the municipal employees of a city of 625,000 people. His "What Is An Accident?" represents a good deal of thought in the determination of the fundamental causes of accidents and personal injuries.

What Is An Accident?

The word "accident" occurs many times daily in our newspapers, but can you tell what an accident really is? Well, don't feel too badly if you are unable, on the spur of the moment, to think of a good definition. Even among those whose full time job is accident prevention there are widely different views as to what an accident is. Some say that Webster's definition is wrong in spite of the fact that the courts accept it. Others go so far as to say that there is no such thing as an accident.

Perhaps this lack of understanding or agreement as to what we are trying to prevent when we say we are trying to prevent "accidents" is some explanation of the fact that during 1939, in this free country of ours accidents resulted in:

Persons killed	93,000
Persons permanently disabled	320,000
Persons temporarily disabled	8,500,000
An estimated cost of these injuries amounting to	$2,300,000,000
And property damaged to the extent of over .	$1,000,000,000

The District of Columbia Gov-

ernment contributed its full quota to this total.

The President of the United States and the Commissioners of the District of Columbia expect each of us as Government employees to do our part in reducing the number and severity of these accidental injuries.

If we are to *prevent* accidental injuries, we must of course either stop the *accidents* that cause them, or so muzzle or control the accidents that they become harmless.

That brings us right back again to where we started: "What is an accident?" We certainly must know what an accident is and be able to recognize one when we see it if we are to do much of a job of accident prevention or control. Shooting at the shadow of an accident or at its victims is not likely to be very effective.

Let's see if it isn't possible to so describe these sneaking killers that we will always be able to recognize them on sight, in whatever form, size or manner they may raise their menacing heads, and thus be able to "shoot from the hip" if necessary to put them out of the way entirely or to capture and put them behind "guards" before they have a chance to get in their injurious and destructive work.

Qualities

From a SAFETY point of view an accident has three principal qualities or attributes, namely:

1) It is an event, a happening, an occurrence;

2) It is unexpected, unplanned, undesigned, unintended, unforseen, not in the usual course of events etc., on the part of the person (s) directly involved or concerned at the time of the occurrence;*

3) It results or may (can, is likely to) result in personal injury or property damage.**

* The expression: "on the part of the person(s) directly involved or concerned at the time of the occurrence" is seldom included in the wording of a definition but it certainly is implied, otherwise the definitions would not make sense.

** In the case of a group or number of similar or like events, anyone of which *may* result in injury or damage, it is impossible to pick out *in advance* the particular one or ones that eventually do so result, thus it is necessary to consider all of these events as *accidents* and prevent them all or to erect adequate barriers against them if we are to be sure of preventing injury or damage therefrom.

Insurance companies usually add a fourth attribute, suddenness, which has no significance in a definition from a safety angle, although it is this suddenness that often explains why the results are disastrous—there was not time enough to get out of the way or to avoid the result of the accident.

On the basis of the foregoing the following definition of accident is given for use in our safety activities: An accident is any unplanned, unforeseen or unexpected occurrence of such a nature that personal injury or property damage may result therefrom, either directly or indirectly, regardless of whether or not injury or damage does so result.

Cause

Since everyone's life is a continuous chain of events, an accident must be a link in such a chain. In most cases there is a series of

events which, taken as a group, are frequently spoken of as an accident, or any of them may be singled out and called the accident. Consider the case of a man working on a roof, the rope holding his platform breaks, the end of the platform swings down the roof, he slides down and off the roof and falls 20 feet to the ground, breaking a leg. What was the accident? In general conversation the entire affair would be considered the accident. However, anyone responsible for safety on such work must be more specific and pick out the single event that was the *real accident* so that he can apply an effective remedy.

The broken leg was the *injury* resulting from the accident, it was not the accident. Falling from the roof, likewise was not the accident —anyone knows and expects that he will fall immediately if the support is taken from beneath him or if he "goes off" the support. Neither was the platform sliding away from him nor his sliding down the roof, the accident. The one thing he did not expect, or plan or foresee, as the case may have been, was the breaking of the rope. That really was the accident. That was the thing that should and could have been prevented by using a good rope of the proper size. Of course there were other measures that might have been taken that would have prevented falling from the roof when the rope broke, in fact he might have gone even farther yet and taken measures to have prevented injury from the fall, such as placing a pile of mattresses on the ground to fall on. (It is hoped we have no employees for whom this last method should be recommended.)

The question is likely to arise as to why *the breaking of the rope* was singled out as the specific event to be tagged as "the accident," since some of the other events also seem to fit the definition. In this mishap it is apparent that the worker had full control of the situation up until some time just before the rope broke, but that he completely lost control of the situation as the rope began to part. Having lost control he was unable to regain it until he reached the ground.

Timing Important

As in this case, so in every series of events of an accidental nature there is some point of time or some occurrence wherein the course of those events passes, temporarily at least, from the control of the person involved. That event is the one which we are primarily concerned in preventing, and thus the one that should be considered as the accident, especially from a safety or accident prevention point of view.

The worker in this accident might have been using a safety line when the rope broke, and thus kept from falling from the roof. In that case also the breaking of the rope would have been the accident. The safety line enabled the worker to *regain* control of the situation before or without being seriously injured.

If there is any question as to which of a series of accidental occurrences was really "THE ACCIDENT" select the one wherein the course of events passed from the control of the person involved.

DON'T RISK SKIN IRRITATION

Du Pont Pro-Tek is a greaseless cream which prevents grime and paint adhering to your hands, and helps to protect the skin from physical contact with materials which may cause irritation. E. I. du Pont de Nemours & Co. (Inc.), Dept. 3-O, Wilmington, Delaware.

DU PONT
PRO-TEK
REG. U. S. PAT. OFF.
THE INVISIBLE GLOVE

Occupational Hygiene Meeting

Dr. Paul J. Jakmauh, Commissioner of Public Health in Massachusetts, announced to all members of New England organizations concerned with industrial health the eleventh meeting of the New England Health Institute, to be held at the Hotel Statler, Boston, April 2, 3 and 4. An interesting section is devoted to Occupational Hygiene, starting at 9:30 Thursday morning. Philip Drinker, S.B., Ch.E., Professor of Industrial Hygiene, Harvard School of Public Health, will act as Chairman of the Section.

The meeting will open with prefatory remarks by W. Irving Clark, Director of Personnel, Norton Company, Worcester, and Chairman of the Committee on Industrial Health, Massachusetts Medical Society.

"National Measures for the Advancement of Industrial Medical Service" will be the first paper, by Dr. Anthony Lanza, Assistant Medical Director of the Metropolitan Life Insurance Company of New York City. Dr. Frederic N. Manley, Plant Surgeon, Bethlehem Steel Company, Shipbuilding Division, Quincy, Massachusetts, will speak on "The Works Physician's Place in National Defense." The final speaker of the morning session will be Dr. Howard W. Haggard, Director, Laboratory of Applied Physiology, Yale University, on the subject, "Absorption and Excretion of Volatile Solvents."

Second Session

On Friday afternoon at two o'clock the second meeting of the Section of Occupational Hygiene will be held. The first speaker is L. S. Ayars, Jr., Eastern District Manager, Accoustical Department, The Celotex Corporation, New York City. His subject will be "Industrial Noise Quieting."

Following Mr. Ayars' paper, a symposium on Occupational Disease Prevention Methods will be held.

On Wednesday evening Commissioner Jakmauh will preside at the general meeting at which Dr. Thomas Parran, Surgeon General, U.S.P.H.S., and Miss Katherine Lenroot, will be the speakers.

INDUSTRIAL HEALTH AND NATIONAL DEFENSE

LEVERETT D. BRISTOL, M.D., Ph.D., ***Medical Director, American Telephone & Telegraph Co.***

OF PRIMARY importance among the objectives common to industrial and military medicine are physical examinations. The scope or extent of preplacement examinations must be based largely on the character and general conditions and needs of the industry or the military assignment. Such examinations may vary all the way from a very brief, superficial physical inspection to a detailed medical examination of an hour or more. We shall have to strike some midground as far as the average examination is concerned. We certainly want to make examinations that are worth something; on the other hand, there is a limit that may be reached as to their practicability from the standpoints of time and expense. Physical tests of employees during the national defense emergency might possibly be based on requirements and record forms previously agreed on jointly by military and industrial authorities. This would be the means of saving time and in the interest of standardized procedures and records in the proper placement of workers in civilian or military positions.

The purpose of medical examinations should not be to keep people out of work or out of military service but rather to know what the actual conditions are and to make certain that the individual does not take up a job for which he is not fitted. Time will not permit of a detailed account of the various types of physical examination procedures and forms of examination classifications or of acceptance and placements standards and causes for rejection. These subjects have been extensively covered from time to time in pamphlets and bulletins of various voluntary and government organizations and are available to those interested in the subject of physical examinations.

Protective safety appliances of every description should be made part of every production program.

Of all measures of industrial preparedness from the standpoint of national defense there is none more important than the periodic health preparedness from the standpoint of national defense there is none more important than the periodi health examination of individuals in working groups. Such examinations should serve not only (a) to guard the health of civilian employees in industry, particularly those in the so-called war industries, from excessive fatigue and possible ill results of speed, pressure and special hazards associated with national preparedness but also (b) to maintain a high level of physical and mental fitness in those private industrial "reservoirs" which at any time might have to be drawn on for government service. Business organizations may thus contribute to national defense by encouraging such health examinations among their employees. Physical examinations, both initial and periodic, fall short of their full value unless followed up with programs for the control and correction of incipient diseases and impairments which are found. Moreover, these examinations, above all, should be considered as important educative experiences.

Public Industrial Hygiene

Prior to 1936 there were in the United States only five state departments of health and two or three state departments of labor conducting industrial hygiene activities, and even these activities were of limited nature. As of 1940, a total of thirty-nine state and local industrial hygiene units have been established in twenty-nine states and two territories, mostly in departments of health. Some of these are of very recent creation and have only skeleton organizations. There is great need that these be strengthened as rapidly as possible as a part of the national industrial health preparedness program. Moreover, additional industrial hygiene units should be organized without delay in the remaining states and territories and additional local governments, particularly of the larger cities. Steps should be taken to make possible the financing of these industrial hygiene units by state and local appropriations. At present nearly 80 per cent of funds budgeted for public industrial hygiene is contributed by the federal government. During the present emergency, additional funds should be provided to the Public Health Service to train additional industrial hygiene personnel. Care should be taken to emphasize that such industrial hygiene activities are properly the function of health departments and to discourage steps taken in a few localities to develop such essential health services in agencies other than health departments.

Conclusion

It may be stated that industrial physicians and industrial hygienists, like medical public health officers, are ready and willing to serve their country in this preparedness emergency. Industrial health work should be a strong arm in national defense, particularly in the preservation of expert workers and assisting in the development of addi-

tional skilled workers. Reducing lost time due to occupational and nonoccupational illness and accidents and cutting down excessive exposure to injurious materials are part of the industrial health program which will be conducive to maximum national effectiveness and production. It is particularly necessary that studies be made to determine unfavorable environmental factors in the production of war equipment and munitions. The business employer or the governmental unit that considers reducing its industrial health program at this time, because of what at the moment may seem to be more important activities, is most unwise. As a matter of fact, the needs of national defense require a strengthening and broadening of the entire industrial health program all along the line from private industry to local, state, and federal jurisdictions. In this significant period of rearmament, during which our chief defense will be our industrial skill, let us be sure that we place first on our list the health and safety conservation of our industrial workers.

Protection Against
NUISANCE DUSTS

- DUPOR No. 1 Respirator has 9 sq. in. filtration area.
- Handy as a pair of glasses — Weighs less than 1 OUNCE.
- Not necessary to remove when talking, eating, etc.
- DUPOR No. 1 has patented valve to exhaust stale air.
- Rubber nose piece gives dust-tight fit on any shape nose.
- Constructed of rubber, plastics and felt—no parts to corrode.
- Thousands already in use.
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H. S. COVER
333 Chippewa St.
South Bend, Ind.

Effective Dust and Fume Control

(Continued from page 10)

through open doors and windows. Ventilation of this type is of some benefit but is generally inadequate for the removal of heavy concentrations of dust, fumes, or gases.

2. Mechanical. This is a positive means of ventilation. There are several important methods of mechanical ventilation which effectively control atmospheric pollution.

(1) Removal at the source by local exhaust equipment. This is the most effective means of elimination. By removal at the source the dusts, fumes, or gases are carried away from the breathing zone of the worker, and contamination of the general workroom air is prevented. After the material is removed at the source, it is carried through a duct system and either dispersed directly to the outside air

or into a collector. Direct discharge of the material into the outside air is frequently unsatisfactory and in the case of harmful materials, under certain weather conditions, these substances may re-enter the workroom area. For the purpose of efficiency of elimination and prevention of bodily harm it is advisable that some type of collector be used to prevent the re-entrance of the material into the shop.

There are several types of collectors used in industry today. The more common types may be roughly classified as follows:

(a) Wet collectors are used with great efficiency in the removal of dusts, fumes and caustic materials.

(b) Dry filters. Bag or screen type filters are in wide use in various types of industries. Particles of small size are filtered from the air through cloth. Pressure loss increases as the filtering process continues due to the accumulation of particles on the cloth. In time this loss increases to such an extent that suction in the exhaust system is materially reduced. A dust-clogged collector can be considered as having the same effect as a partially closed valve. The accumulated material can be removed from the cloth by shaking. If pressure loss is not overcome by frequent enough shaking, the efficiency of the entire exhaust system is reduced but not the expenditure per horsepower. It is not intended here to discredit this type of collector but to condemn the method of operation on the part of plant management. The efficiency of such a system will be in direct proportion to the attention given it.

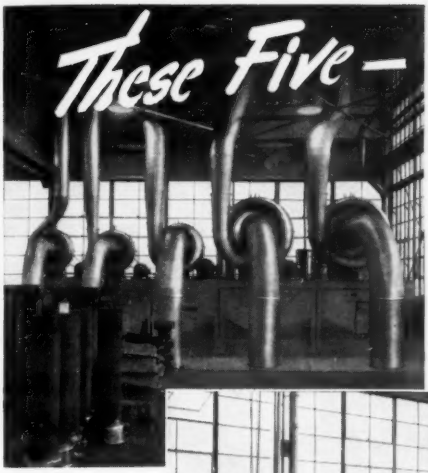
(c) Within the past ten years some cyclone equipment has been developed that has been doing an effective job in the elimination of fly ash nuisance from boiler house chimneys. This equipment is frequently required for use in the system ahead of cloth arrestors for removing the heavy load of coarser chips from the air, so that the filtering medium will not overload too rapidly. Cyclone equipment is in like manner used as separators when either the coarse or fine refuse has by-product value.

Electric precipitators are used with success in the removal of fine particles from air or gas.

(Other methods discussed in coming issue)

Good Housekeeping in April

In April we will publish our annual GOOD HOUSEKEEPING ISSUE. The complete editorial content will be devoted to methods and procedures for keeping the industrial "house" in good order.



ROTO·CLONES

Collect Grinding Dust at Cincinnati Bickford Tool Co.

Lower view shows three types of grinding stations served by the battery of 5 type D Roto-Clones. These stations include floor grills, rectangular and round tables.

Grinding dust is pulled thru grills at the grinding stations and conveyed thru ducts in pipe trenches to the Roto-Clone Precipatators.

The collection of fine floating dust from portable grinding in Cincinnati Bickford's enlarged finishing department is performed by 5 type D Roto-Clones. These units serve 10 stations comprising 4 floor grills, 4 rectangular tables, and 2 round tables. A total of 51,000 cubic feet of air per minute is exhausted which carries the generated dust downward from the grinding tools through grilled openings beneath the work.

Complete information on the application of the Roto-Clone to all types of industrial dust control is available without obligation. Write for Roto-Clone Bulletin No. 272.

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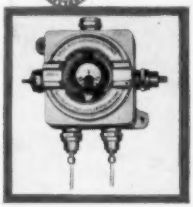
M. S. A. EXPLOSIMETER
Model 1

The original pocket-size combustible gas indicator—widely employed wherever the need for periodic or intermittent testing of atmospheres for explosibility exists in industry. Contained in a durable, molded bakelite case—ready for use at any time.

M. S. A. *Explosion-Proof* COMBUSTIBLE GAS ALARM

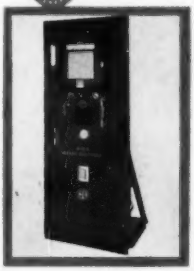


For safely and continuously sampling atmospheres where combustible vapors may be present—gives instant warning when predetermined concentration is reached. Completely contained in Underwriters-approved explosion-proof condulet. May be adapted for automatic process control.

M. S. A. EXPLOSIMETER
Model 2

Meets the demand for a compact, simple and dependable combustible gas indicator where every day usage is required. One hand only is needed to operate the instrument—the other is free to handle a sampling line or probe. Employs standard flashlight batteries; one-piece flow system; built-in filter chamber

M. S. A. OXYGEN RECORDER



Regarded as the most scientifically precise and dependable means of continuously measuring and recording oxygen in other gases, the M.S.A. Oxygen Recorder now is available completely assembled on a steel panel, simplifying installation and maintenance. A number of other important refinements are included, adding to this instrument's proved reliability.

M.S.A. COMBUSTIBLE GAS ALARM (not illustrated) can be provided with a multi-point testing system for sampling from four, six, or eight locations through one analyzer, and it can be interconnected with a recording potentiometer to produce a continuous graphic record of combustibles in the atmospheres tested. *Other M.S.A. INSTRUMENTS FOR GAS DETECTION AND CONTROL include: Carbon Monoxide Detectors; Carbon Monoxide Indicators; Carbon Monoxide Alarms; Hydrogen Sulphide Detectors; Pyrotannic Detectors; Hydrocyanic Acid Gas Detectors;* ***and the improved*** *Carbon Monoxide Recorder.*

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